CLAIMS

What is claimed is:

1. A method for managing data in a data storage system, the data storage system including a plurality of physical storage devices, the method comprising the steps of:

a) providing a plurality of modules, each of the plurality of modules including at least one child;

b) receiving an input command related to the data by one of the plurality of modules from a source, wherein the source is transparent to the one module;

c) deciding which child of the at least one children to pass the input command; and

d) passing the input command to the decided child for processing the data according to the input command.

2. The method of claim 1, wherein the source comprises another module.

3. The method of claim 1, wherein the one module is the child of another module.

4. The method of claim 1, wherein the source is a client computer.

5. The method of claim 1 further comprising the step of:

e) determining whether the decided child is another module of the plurality of modules; and

f) repeating steps b) – d) if the decided child is determined to be another module.

6. The method of claim 5 further comprising the step of:

g) if the decided child is determined in step e) to be a physical storage device, accessing the data stored in the physical storage device according to the input command.

7. The method of claim 6, wherein the accessing step g) further comprising:

g1) building commands in the physical storage device to process the input command; and

g2) executing the commands in the physical storage device.

8. The method of claim 7, wherein the physical storage device is a disk drive.

9. The method of claim 8, wherein the built commands are small computer system interface (SCSI) commands.

10. The method of claim 7, further including the step of:

h) returning a status message from the decided child module to the parent module; and

i) repeating step h) until the parent module is an operating system of a host.

11. A computer readable medium containing programming instructions for managing data in a data storage system, the data storage system including a plurality of disk drives, the programming instructions for:

a) providing a plurality of modules, each of the plurality of modules including at least one child;

b) one of the plurality of modules receiving an input command from a source, wherein the source is transparent to the one module;

c) deciding which child of the at least one children to pass the input command; and

d) passing the input command to the decided child for processing.

12. The computer readable medium of claim 11, wherein the source comprises another module.

13. The computer readable medium of claim 11, wherein the one module is the child of another module.

14. The computer readable medium of claim 11, wherein the source is a client computer.

15. The computer readable medium of claim 11, further comprising the instructions for:

e) determining whether the decided child is another module of the plurality of modules; and

f) repeating steps b) – d) if the decided child is determined to be another module.

16. The computer readable medium of claim 15 further comprising the instruction for:

g) if the decided child is determined in step e) to be a disk drive, accessing the data stored in the disk drive according to the input command.

17. The computer readable medium of claim 16, wherein the accessing instruction g) further comprising:

g1) building commands in the disk drive to process the input command; and

g2) executing the commands in the disk drive.

18. The computer readable medium of claim 17, wherein the built commands are small computer system interface (SCSI) commands.

19. The computer readable medium of claim 17, further including the instructions for:

h) returning a status message from the decided child module to the parent module; and

i) repeating step h) until the parent module is an operating system of a host.

20. A system for managing data in a data storage system, the data storage system including a plurality of physical storage devices, the system comprising:

a host computer for allowing a user to enter an input command related to data in the data storage system;

a controller having an input coupled to the host computer and an output coupled to the plurality of physical storage devices, the controller further comprising:

a plurality of modules, each of the plurality of modules including at least one child;

means for one of the plurality of modules receiving the input command from a source, wherein the source is transparent to the one module;

means for deciding which child of the at least one children of the one module to pass the input command; and

means for passing the input command to the decided child for processing the data in accord with the input command.

21. The system of claim 20, wherein the source is another module.

22. The system of claim 20, wherein the one module is the child of another module.

23. The system of claim 20, wherein the source is the host computer.

24. The system of claim 20, wherein the decided child is one physical storage device of the plurality of physical storage devices.

25. The system of claim 24, further comprising means for accessing the data stored in the one physical storage device.

26. The system of claim 25, wherein the means for accessing the data includes a plurality of control chips coupled to the controller, each control chip coupled to a corresponding physical storage device of the plurality of physical storage devices, wherein each control chip includes means for building commands to access the data in the corresponding physical storage device in accordance with the input command.

27. The system of claim 26, wherein the commands are small computer system interface (SCSI) commands.

28. A method for rebuilding a disk drive in a redundant data storage system having a plurality of disk drives, wherein one of the disk drives becomes degraded, the method comprising the steps of:

a) providing a plurality of modules, each module including a plurality of children, wherein the plurality of children are disk drives and wherein a degraded module includes a degraded child which is the degraded disk drive;

b) detecting the presence of a new disk drive replacing the degraded disk drive;

c) creating a spanned partition;

d) coupling the spanned partition to the degraded module; and

e) rebuilding the new disk drive by the spanned partition, such that the new disk drive includes data stored in the degraded disk drive.

29. The method of claim 28, wherein the rebuilding step (e) further comprising:

e1) creating a nondegraded module, wherein the nondegraded module is identical to the degraded module except that the degraded child is replaced by a new child which is the new disk drive;

e2) coupling the nondegraded module to the spanned partition;

e3) reading data from the children of the degraded module;

e4) determining data in the degraded child from the data read in step (f3); and

e5) writing the data determined in step (e4) to the new child in the nondegraded module.

30. The method of claim 29, further including the steps of:

f) decoupling the degraded module and the nondegraded module from the spanned partition;

g) replacing the degraded module with the nondegraded module;

h) discarding the degraded module; and

i) extracting the spanned partition.

31. A computer readable medium containing programming instructions for rebuilding a physical storage device in a redundant data storage system having a plurality of physical storage devices, wherein one of the physical storage devices becomes degraded, the instructions comprising:

a) providing a plurality of modules, each module including a plurality of children, wherein the plurality of children are physical storage devices and wherein a degraded module includes a degraded child which is the degraded physical storage device;

b) detecting the presence of a new physical storage device replacing the degraded physical storage device;

c) creating a spanned partition;

d) coupling the spanned partition to the degraded module; and

e) rebuilding the new physical storage device by the spanned partition, such that the new physical storage device includes data stored in the degraded storage device.

32. The computer readable medium of claim 31, wherein the rebuilding instruction (e) further comprising:

e1) creating a nondegraded module, wherein the nondegraded module is identical to the degraded module except that the degraded child is replaced by a new child which is the new physical storage device;

e2) coupling the nondegraded module to the spanned partition;

e3) reading data from the children of the degraded module;

e4) determining data in the degraded child from the data read in step (f3); and

e5) writing the data determined in step (e4) to the new child in the nondegraded module.

33. The computer readable medium of claim 32, further including the instructions for:

f) decoupling the degraded module and the nondegraded module from the spanned partition;

g) replacing the degraded module with the nondegraded module;

h) discarding the degraded module; and

i) extracting the spanned partition.